



US006149757A

United States Patent [19]

Chikaki et al.

[11] Patent Number:

6,149,757

[45] Date of Patent:

Nov. 21, 2000

[54]	LAMINATING APPARATUS			
[75]	Inventors: Yoshiro Chikaki; Masafumi Ito; Tsugio Kirino, all of Tokyo, Japan			
[73]	Assignee: N.P.C. Inc., Tokyo, Japan			
[21]	Appl. No.: 09/006,074			
[22]	Filed: Jan. 12, 1998			
Related U.S. Application Data				
[63]	Continuation of application No. 08/578,109, Dec. 26, 1995, abandoned.			
[30]	Foreign Application Priority Data			
	27, 1994 [JP] Japan 6-17044 24, 1995 [JP] Japan 7-329791			
[52]	Int. Cl. 7			

[56] References Cited

U.S. PATENT DOCUMENTS

4,104,101		Garabedian 156/285
4,210,462	7/1980	Tourneux 156/286 X
4,365,547	12/1982	McClure, Jr 100/38
4,421,589	12/1983	Armini et al 156/382
4,689,105	8/1987	Fazlin et al 156/382
5,078,820	1/1992	Hamamura et al 156/267

5,182,121	Miyashita 156/382 X
5,324,382 5,399,223	Whiteside 156/359
5,403,421	 Vogt
	 Diekwisch

OTHER PUBLICATIONS

Letter dated Dec. 12, 1996 from Michael W. O'Dougherty to Hisashi Sato.

Letter date Jan. 23, 1997 from John M. DiMatteo to Michael W. O'Dougherty.

Primary Examiner—Francis J. Lorin
Attorney, Agent, or Firm—Patterson, Belknap, Webb &
Tyler LLP

[57] ABSTRACT

According to the present invention, there is proposed a laminating apparatus for laminating materials to be laminated. The apparatus includes at least one laminating section (9). Each laminating section (9) comprises an upper chamber (5) and an under chamber (6) wherein both chambers are divided with a diaphragm means (4). The apparatus further includes a heating stage (10) for heating the materials put on the stage in the under chamber (6). The stage (10) is movable between an upward position and a downward position. Further the apparatus includes a supporting means (13) which can support the materials in a position above and apart form the upper surface of the stage (10) when the stage locates in its downward position.

12 Claims, 13 Drawing Sheets

